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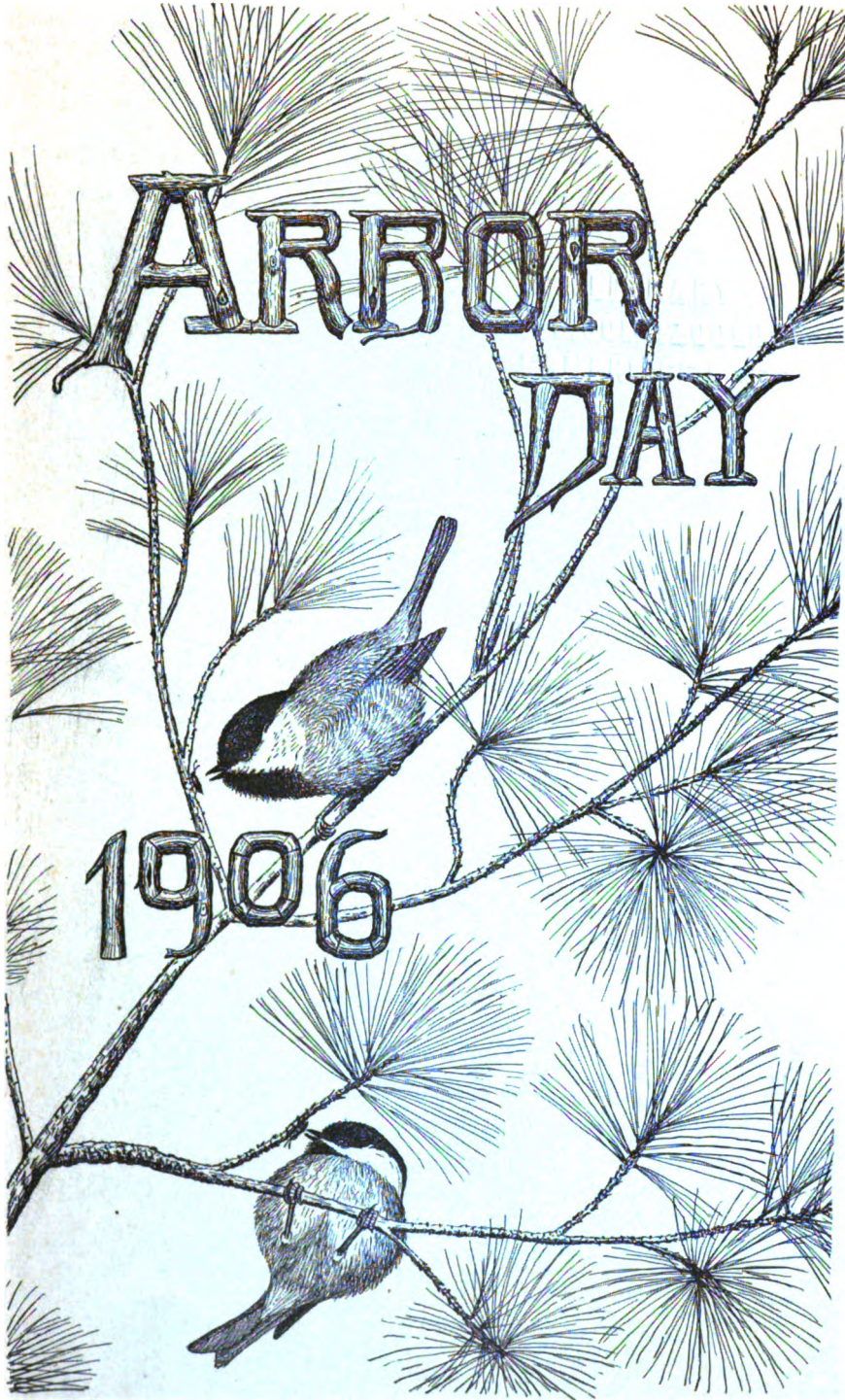
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ARBOR DAY

IN

MASSACHUSETTS.

APRIL 28, 1906.

ISSUED FROM THE
OFFICE OF THE STATE BOARD OF AGRICULTURE.



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1906.

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ARBOR DAY ESTABLISHED IN MASSACHUSETTS.

The resolve establishing an Arbor Day in this Commonwealth was passed by the Legislature of 1886 (chapter 32), and was approved by the Governor on April 9 of that year. The resolve is as follows : —

Resolved, That his excellency the governor is requested to set apart in each year the last Saturday in April as Arbor Day, and to issue his proclamation recommending that it be observed by the people of the Commonwealth in the planting of trees, shrubs and vines, in the promotion of forest growth and culture, in the adornment of public and private grounds, places and ways, and in such other efforts and undertakings as shall be in harmony with the general character of a day so established.

A copy of the proclamation of His Excellency Governor Guild for the current year has very kindly been supplied by him for incorporation in this pamphlet.

COMMONWEALTH OF MASSACHUSETTS.

By His Excellency CURTIS GUILD, Jr., Governor : —

A PROCLAMATION.

In accordance with the provisions of section 16 of chapter 53 of the Revised Laws, and in conformity with the custom founded thereon, I hereby set apart Saturday, the twenty-eighth day of April current, as Arbor Day.

Let the day be observed by the people by planting trees, shrubs and vines.

I suggest that, especially in the towns, systematic and logically developed plans be considered by the local governments for the protection of all highways alike from wind and rain by the planting of trees along the roadside.

The oak, the ash, the elm, the maple, the locust, the poplar and the willow are particularly suitable for this purpose. I suggest that those highways most in need of protection, and the kind of trees desired, be specified by the local authorities in appeals to the people.

Let each citizen who plants a tree feel that he is leaving behind him a living monument of civic service, that in the days to come shall be not a reminder merely, but a comfort to those who pass beneath its cooling shade.

Let the children in the public schools be taught that every egg they take from the nests of the birds means the death of a little friend of Massachusetts, means one less winged crusader against the gypsy moth, the brown-tail moth and the crawling pests that destroy the food of the people and the beauty of the land.

Save the trees! Save the birds that we may save the trees!

Given at the Executive Chamber, in Boston, this second day of April, in the year of our Lord one thousand nine hundred and six, and of the Independence of the United States of America the one hundred and thirtieth.

CURTIS GUILD, JR.

By His Excellency the Governor,

WILLIAM M. OLIN,

Secretary of the Commonwealth.

GOD SAVE THE COMMONWEALTH OF MASSACHUSETTS.

Commonwealth of Massachusetts.

STATE BOARD OF AGRICULTURE,
OFFICE OF THE SECRETARY, STATE HOUSE, BOSTON.

This little pamphlet in the interests of Arbor Day is the first of its kind to be issued by the Commonwealth of Massachusetts, and is the outcome, largely, of an expressed desire on the part of the forestry department of the State Federation of Women's Clubs that such a publication might be supplied by the State. After inquiry and consultation, and an examination of Arbor and Bird Day publications of other States, it has been deemed expedient to issue this pamphlet, primarily for the benefit of the teachers and pupils in our public schools.

Twenty-five hundred copies of the pamphlet have been printed and mailed, largely to superintendents of schools, to be given to teachers of nature study in schools, or other teachers especially interested in the natural sciences, with the expectation that they will seek to bring about some observance of the day the present year, and also endeavor in their teaching to impress upon their pupils the value of our common trees, flowers and birds.

The secretary of the State Board of Education kindly provided for mailing the copies sent to superintendents of schools.

In the preparation of the pamphlet, as will be seen, this office has been greatly assisted by the secretary of the State Board of Education, the State Superintendent for Suppressing the Gypsy and Brown-tail Moths, the forestry department above referred to, the ornithologist to this Board, and to Professor Maynard, the well-known landscape gardener and horticultural specialist.

J. LEWIS ELLSWORTH,
Secretary.

ARBOR DAY.

BY MRS. CORA C. STUART JONES, CHAIRMAN, DEPARTMENT OF FORESTRY, STATE FEDERATION OF WOMEN'S CLUBS.

It is pleasant to have for a subject one that in its name suggests comfort and rest, a shelter for the weary, a grateful shade to the traveller. Arbor Day speaks only of joy, progress, hope, — the most unselfish of days, providing for the welfare of the future, adding to the joy of our descendants, rather than glorifying the deeds of our ancestors.

The first settlers found on the shores of their new home unlimited forests, reaching, as far as they knew, from shore to shore. The necessity of clearings for their farms led them to look upon the forests as their natural enemy, to be disposed of by axe and saw; so for years forest destruction seemed in the line of progress. The woodman's axe was the symbol of civilization. What a change of scene met the eyes of those who, in later years, emerged from the cool, protecting woods upon the vast, treeless, sunburned plains of the west.

Here, under the fierce rays of the sun, in the blinding sand storms, in the death-dealing winds of winter, they learned the value of trees; realized as never before their beauty, their protection, their life-saving, life-giving properties. So out of man's necessities grew the sentiment for which Arbor Day was born. Early settlers destroyed the forests, that the fields might bloom; we must protect the forests, that the fields may not cease to bloom.

J. Sterling Morton of Nebraska, Secretary of Agriculture, who for eighteen years had planted trees about his home, Arbor Lodge, making it a cool, green, sheltered spot on a burning, wind-swept plain, in 1872 conceived the idea of setting apart a day for tree planting. Before that time rows of trees as wind-breaks about the ranch buildings, with here and there a little foliage along the river banks, were all that gave variety to that great, rolling prairie.

Mr. Morton, on Jan. 4, 1872, in the city of Lincoln, Neb., at a meeting of the State Board of Agriculture, introduced a resolution declaring that a day in April be set apart for tree planting, to be named Arbor Day, its object to avert treelessness, to improve the climatic conditions, for the sanitation and embellishment of home environments, for the love of the beautiful and useful, combined in the music and majesty of a tree, as fancy and truth unite in an epic poem. On March 31, 1874, Gov. Robert W. Furnas issued the first proclamation for the observation of the day. Some years later the Legislature made the 22d of April — Secretary Morton's birthday — a legal holiday, and christened it Arbor Day. So quickly did it appeal to the intelligent, beauty-loving people of the State, that upon its first anniversary one million trees were planted, and within sixteen years three hundred and fifty-five million forest, fruit and shade trees, one firm alone having a contract for planting three and a half million forest trees.

Already forty-two States observe Arbor Day, either as a legal holiday or as a day set apart by their Governors. Arbor Day has entered Canada and Mexico, and crossed the seas to Great Britain and India.

It is estimated that railroads, manufactories and forest fires consume in the United States an average of twenty-five thousand acres growth every twenty-four

hours. With this enormous consumption, the need of tree planting becomes greater, and the importance of Arbor Day increases. As more than twice as much wood is consumed as can be grown on our forest area, Arbor Day cannot hope to repair the loss, but will set in motion those ideas that in time will develop systematic forest management, such as is practised by European nations, and forest guardians to enforce protective laws will reduce our loss to a minimum.

It is important that Arbor Day should be celebrated in the schools, for, much as we may hope to influence the present generation toward tree preservation, it is among the children that the greatest work must be done. Only by arousing a tree-planting sentiment among them can we hope for forests in the future. Our States do not own great forest areas, as in Europe, even private estates seldom pass from generation to generation in one family; so that we must depend upon public sentiment for our tree preservation, — upon individual effort. Therefore we cannot place responsibility upon the government, — it is the people to whom we must look, and the people must be taught through the public schools.

The day was first celebrated in schools, in America, through the influence of the Forestry Association, which met in Cincinnati in 1882. The city put on its holiday attire; public schools were dismissed, that teachers and pupils might take part in the ceremonies. Fifty thousand people assembled in the parks to attend the planting. Upon the firing of a gun, memorial groves, such as President Grove, Pioneers' Grove, Battle, Citizens', Authors' groves, were planted by loving hands, and dedicated with appropriate ceremonies. In each grove tablets with inscriptions were set. The celebration aroused great enthusiasm, and this Cincinnati planting of memorial trees and groves has been followed by other States, and recommended in the schools of Great Britain.

To-day the beautiful ash trees planted by Washington at Mt. Vernon are not the least of his memorials. New Haven, with its famous elms, holds in grateful remembrance Hon. James Hillhouse, by whose hands they were planted. What monument of marble moves the heart of every true American as does the Washington elm in Cambridge, and as did our beloved Boston elm, upon whose fall the church bells tolled.

In towns where children can plant trees the day may be celebrated out of doors, by instructing the scholars how to plant trees previously selected, and for which holes have been carefully prepared. Poems may be read and songs sung relating to their beauty and growth, thereby investing them with an interest and affection that always follows a knowledge of their life, habits and value. The child who has thrown his handful of earth about the roots of a tree will ever watch its growth, and through the love of one will come interest in the woodlands.

Children's boundless activities find their outlet in destruction, because of their ignorance. Give the average child the rudiments of knowledge concerning the value of trees, and the destructive energy becomes protective. Let the celebration of Arbor Day infuse into our school system — reaching, as it does, the heart and life of every child — the purpose and the will to exert every influence to change this destructive process to one of increase, and teach those habits of thought regarding the benefits and uses of trees that will deter the children from careless setting of woodland fires, and thoughtless mutilation of street and park trees.

On Arbor Day the children may apply the knowledge gained from nature study, out-of-door schools, field work, — whatever name you choose to give that

broadening educational impulse that brings the child in touch with the out-door world, rather than with books. It is permeating our schools to-day.

Tree planting is educational in the largest sense: the handling and planting encourages observation and cultivates a love of all natural objects, and, above all, teaches unselfishness in seeking to enrich the future.

ARBOR DAY IN THE SCHOOLS.

BY HON. GEORGE H. MARTIN, SECRETARY, STATE BOARD OF EDUCATION.

The setting apart of one day in the year, to be observed as Arbor Day, "in the planting of trees, shrubs and vines, in the promotion of forest growth and culture, in the adornment of public and private grounds, places and ways," is only a means to a larger end, namely, the education of the people to the value of trees as a public asset. One day is set apart for this purpose in order that all days may become arbor days; that, by the holiday spirit and the influence of collective effort on one day, the planting of trees may become habitual, the care and preservation of trees a matter of constant and general interest, the adornment of public and private places the rule and not the exception.

It is important that the schools should see this larger purpose, and plan their work in the light of it.

THE PREPARATION FOR ARBOR DAY.

From what has just been said it is evident that the success of the observance of Arbor Day by a school will be measured by the intelligence and interest with which trees have been studied throughout the year. If the teacher has in mind the essential idea to be taught, — the value of trees to a community, — abundant opportunities for impressing the lesson will present themselves. Through home geography the way is easily opened to show the relation of trees to man, for shade, for food, for fuel, for shelter, for beauty.

In this study the differences in trees will early be noticed, in their appearance, their habits, their habitat, their uses; and without formal lessons the children will be found growing more and more keen in their observation, and more and more intelligent in their thought. The seasonal changes in the trees will be watched with as much interest as other phases of nature.

When the children widen their thought from home geography to the geography of the world, they will find their old friends, the trees, taking on new and strange forms, as the people do; they will find forests more extensive; they will study the effects of forests upon climate, and they will learn that the trees may not only serve the people who live among them, but people far away. In this connection a lesson on forestry will prove useful, showing the necessity, its purpose, and how it is carried on in other countries.

With this thought about trees should go efforts to cultivate the taste, to develop the sense of beauty, so that children should increasingly come to feel the difference between beauty and ugliness in their surroundings; to admire a shaded

street, a symmetrical and healthful tree, a vine-covered porch or wall; to prefer verdure to barrenness.

This is a slow process, as all education is; but when it is completed, when the children have become tree-wise and tree-loving, the broad purpose of Arbor Day will have been accomplished. In this work teachers will find help in pictures, especially such pictures of beautiful grounds and parks, and pictures showing the transformation of old, abandoned and unsightly country houses into places of beauty by means of trees, shrubs, vines and flowers, as are published in the magazines devoted to country life.

Some poetry and some descriptive prose may be used to minister to the same end, — the cultivation of right feelings; they will be helped on the side of use by cabinets of woods and by pictures of lumbering processes; but nothing can take the place of familiar acquaintance with real trees.

THE OBSERVANCE OF ARBOR DAY.

The best results of Arbor Day will be attained when children and parents unite in its observance. If any such process of education has been carried on in any school as I have described, the children will not be satisfied with a barren and desolate school yard, such as disfigure most of the towns and cities of the State. Arbor Day affords an opportunity for the children to enlist the interest and co-operation of their parents, first, in beautifying the school grounds.

For the help which the parents give in planting, the children can show their appreciation by singing and recitations, or other forms of entertainment appropriate to the day; and a picnic lunch would fill out the day, and help to make it enjoyable and its repetition welcome.

From the adornment of the school grounds the step would be easy to the improvement of the other public places, as the town common and the public streets.

This will not proceed far before it will be felt that cleanliness and the removal of unsightly objects are necessary to make a place attractive. So Arbor Day will come to be used for cleaning up, as well as for planting.

With the more advanced students in physical and commercial geography the approach of the day might be profitably used to concentrate their attention upon the questions widely agitating the public, regarding reservations of forest areas, and scientific forestry as matters of public policy. The literature of the subject is becoming abundant, and much of it would be found interesting to students if their attention were called to it.

More importance should be attached by teachers and school officers to the process of education into the spirit of Arbor Day than to its observance. If only once a year there is a spurt of enthusiasm for tree planting or school ground ornamenting, little good will be accomplished. Trees and shrubs will not care for themselves; they need affectionate interest and watchful protection. Trees and shrubs dying or dead for want of water, or defoliated by insect pests, or scrawny and scraggly for want of trimming, are more offensive than barrenness. Through spasmodic celebrations the last state of a school yard may be worse than the first.

The training needs to send its roots deep, if it is to be enduring and perennially fruitful.

THE SELECTION AND CARE OF ORNAMENTAL TREES, SHRUBS AND VINES FOR SCHOOL YARDS AND ROADSIDES.

BY SAMUEL T. MAYNARD.

Nothing adds more to the beauty and comfort of school yards and roadsides than ornamental trees, shrubs and vines, and too little attention is given to their growth and care. The problem of ornamenting the school yard is a much more difficult one than that of the roadside. The soil and other conditions about the former are generally unfavorable to the growth of trees, etc., without special preparation; while along the roadside the conditions are favorable for a most rapid growth, and there is more or less material already established. The soil about the school yard is trodden so hard that the soil moisture escapes too rapidly in dry weather, and rain runs off too quickly; while by the roadside the moisture is held by the soil cover, and rains are quickly absorbed by the light, porous surface soil, while enriching material is constantly being washed about their roots.

DECORATING THE SCHOOL YARD.

In decorating school yards there is no use in planting small trees, as they are sure to be injured by the pupils in their rough-and-tumble games. Trees from four to six inches in diameter may be obtained from the swamps, by the roadside or forests or from the nurseries, which, if planted in properly prepared soil, the surface of which is made and kept mellow for a few years, and fertilizing matter is spread about them every fall or spring, will make a rapid growth. These trees should be arranged on the north and east and west rear sides, to supply shade in summer and shelter in the winter, but open to full light, as shown in the picture, which represents a well-decorated country school yard.

Among the best trees for the decoration of school yards are the white elm (common elm), sugar maple, silver maple, red maple, red oak, white oak, etc.

The white elm is the finest shade tree in the world, growing high, with arching branches that shade and yet allow a free circulation of air under them. It is easily transplanted, and good trees may be obtained from the swamps and meadows with the roots near the surface, so that they may be easily dug. The roots are great surface feeders, so that small shrubs or plants do not grow well under them unless a large amount of fertilizing material is used, and the roots cut off frequently in spading up the soil about them.

The sugar maple is very largely planted, but it branches low, and the head must be started high, or frequent severe pruning of the lower main branches will be needed.

The silver maple is the most rapid grower of the maples, and grows to a large size, but has a tendency to form forked main branches that are sure sooner or later to be broken down by ice or snow. This tendency may be overcome by allowing but one leader to grow, heading in from time to time all but one of the main central branches.

The red maple is a rapid-growing tree in moist, strong soil; and nothing is more beautiful than this tree when in bloom, or when the colored leaves appear in the autumn.

The oaks when well established are most desirable shade trees. They are rather difficult to transplant and slow in starting, but when once established in good soil grow about as rapidly as any other native tree. Even the elm cannot supply a more ideal shade tree for the country schoolhouse than the white oak shown in the accompanying picture, which has stood for three-quarters of a century, and is good for another century at least. The red oak is more easily transplanted than the other species, and is more rapid in growth, upright in habit, but perhaps not quite so sturdy and long lived.

Evergreens cannot be successfully grown about the school yards if used as a playground, on account of the injury caused by contact with them while frozen. If large evergreen trees are standing on the ground, the lower branches can be



A well-decorated country school yard.

trimmed off, and beautiful results be obtained. Evergreens in winter, when all other trees are bare, are very decorative.

Small trees and shrubs cannot well be used upon school grounds unless protected by gas-pipe railing or netting fence. The shrubs that will stand best under such conditions are the lilacs, hydrangea, cornels, Japanese roses, mock oranges, etc. A very good border protection for the more delicate shrubs is the Japanese multiflora rose. This is a vigorous grower, stands pruning well, and its spines are so numerous and long that few pupils will make a second attempt to get through it.

CLIMBING VINES.

Bank walls, fences, screens and even verandas may be prettily covered by some of the stronger growing vines. For stone walls, brick or stone buildings the Japanese woodbine (Boston ivy) (*Ampelopsis Japonica Vietchii*) is the most satisfactory, as its numerous disk-like tendrils cling to the rough surfaces without support. The common woodbine (*A. quinquefolia*) is very hardy and desirable

for covering fences, verandas, etc., but must be supported by staples or hooks. Where vines are trained against the sides of wooden buildings, wires stretched upon brackets or rods ten inches to a foot away will prevent decay of the wood-work, and the vines will do much better.

ANNUALS AND BEDDING PLANTS.

In well-prepared soil, and when the pupils are under good discipline or interested in school garden work, seeds of annual flowering plants may be sown or bedding plants set out that will add very much to the summer beauty of the grounds; but very few of these plants will reach the blooming stage until after the summer term has closed. Spring flowering bulbs and other early flowering



White oak, three-fourths of a century old.

perennials are very satisfactory. The Dutch bulbs, crocuses, tulip, hyacinth, narcissus, etc., are especially useful, and require but little care. For good results the soil must be deeply worked, and enriched with from four to six inches of fine, rich stable manure thoroughly worked into it. The earlier the bulbs are planted in the fall the better, though they may be planted as late as Thanksgiving time, when the season is open, with good results. The beds are much improved if covered with six inches of coarse stable manure or leaves before the ground freezes. This covering should be removed before growth begins in the spring, or the plants may be injured in trying to force their way through the covering.

ORNAMENTING ROADSIDES.

The great beauty of our New England drives is due largely to the roadside decoration. No country in the world can boast of so many beautiful native trees, shrubs and climbing vines, and we find the best possible conditions for their

growth along our roadsides. With such material and such conditions all we have to do to produce beautiful results is to cut out all undesirable and weedy growth, and give the beautiful trees, shrubs and vines a chance for full development. Large groups or masses of trees, shrubs or vines in a place give a more pleasing effect than mixed groups. Thus two or three pines, a group of maples, elms, birches, sassafras, etc., with space enough between them for full development, then groups of shrubs or climbing vines over fences or stone piles, or clean grassy surfaces for a distance, give a great variety. In some places low-branching trees are desirable to shut out unsightly objects; while in others high-branching trees or no trees at all will enable the tourist to see beautiful water or mountain views.

In most cases the material growing along our roadsides is especially adapted to the soil and exposure in which they are growing, and it only requires a little skilful pruning, training and protection from injury by other less desirable growth to produce beautiful specimens. Here is where the tree warden can save much of the natural beauty of our roadsides, exercising skill and good judgment in the work, instead of cutting indiscriminately everything within fixed limits. Too many of our tree wardens are simply tree butchers, with no knowledge of tree growth or love for the beautiful, pruning only by one rule, which they can only apply to all trees alike. This official should confer with the abutters, and aid and assist them in every way possible to help on the good work of improving our roadsides, instead of assuming all knowledge of the subject, and not allowing any work of this kind to be done except under his "superior" advice and direction.

In places where the roadside is bare of all tree growth, other than native trees may be planted, adding much to the variety and beauty. Along straight lines of road avenue, planting of elms, maples, tulip trees, oaks, etc., are in keeping; but too much of this work becomes monotonous, and should be broken by groups of shrubs or small trees at the entrance of gateways, bars, etc., or in runs or on steep embankments.

PRUNING.

Much of the beauty of roadside trees and shrubs depends upon how skilfully they have been trained. Pruning should be done on the principle of "a little and often." From the start give them that little direction from time to time that will keep them in perfect form, and not allow forked main branches. All cuts should be made with a saw, and all wounds covered with a coat of paint or some other preservative. The maples, birches, walnuts, etc., that flow sap, should not be pruned until the leaves are nearly out in the spring.

FERTILIZING ROADSIDE TREES.

In many cases trees start to grow or are planted in soil not suitable for their growth. These may often be started into a vigorous growth by the application of a little stable manure, or by a mulch of any strawy material, weeds or small brush spread a few inches deep about the roots. The road scrapings, if containing considerable organic matter, spread two or three inches deep about the weak trees, will often make them grow more rapidly, and soon catch up with their neighbors under better soil condition. The aim in all this work should be to produce the most perfect specimens of its kind, and obtain as great variety and beauty as possible.

HOW BIRDS CARE FOR TREES.

BY EDWARD HOWE FORBUSH.

An eminent French savant once said that the bird could live without man, but that man could not live without the bird. A distinguished American naturalist opines that, were all the birds destroyed, trees, shrubs, vegetables and all domestic animals would die, and we should be obliged to live on fish. Such statements may give an exaggerated idea of the importance of birds, for no one can safely predict exactly what would happen were all the birds exterminated. Nevertheless, it is plain that birds are essential to man's welfare.

Many people regard them merely as interesting and attractive objects. The beauty and grace displayed by the little birds about our door yards, the music of their songs, the mystery of their migrations, the weird wildness of the sea bird's calls, the majesty of the eagle's soaring flight, — all have been long appreciated by nature lovers and sung of by poets; but it is only recently that we have begun to realize the fact that we are largely indebted to birds for many of the blessings that we enjoy, and that birds are eminently useful as well as beautiful.

Did you ever stop to think how much we owe to the birds for their care of our spreading shade trees, our fruitful orchards and our verdant woods?

The bird is just as necessary to the tree as the tree is to the bird. The tree furnishes the bird with nesting places, shelter and food. It bears buds, blossoms and seeds which birds eat, and also furnishes food for insects and other animals on which birds feed.

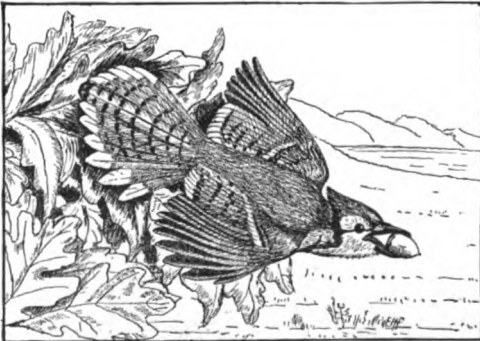
In return, the birds distribute the seed of the tree, that other trees may succeed it and that its descendants may occupy more ground. They assist and regulate nature's pruning of the tree; they guard the tree against destruction, for they check the increase of many creatures that feed upon it.

The truth of these statements has been proved by a study of the habits and food of birds. Let us see then how birds work for the welfare of the trees.

THE SEED PLANTING.

If the seeds of each tree were to fall on the ground beneath its branches and remain where they fell, there would be very little extension of the forest; but

nature always provides means for distributing seeds over the land. The seeds of some trees are each furnished with a sort of wing, so that when the wind blows them from the tree they may float away and be carried to some distance. Such are the seeds of the pine, ash and maple. Other seeds, like those of the oak and walnut, have no wings of their own, but nature lends them the wings or legs of the birds or squirrels.



Planting the forest. The blue jay lends wings to the acorn.

Birds, while flying away with nuts, acorns or other seeds, often drop one, and seldom pick it up. Squirrels hide nuts, acorns and other tree seeds in the leaf mould on the ground. They plant such seeds at just the right depth.

The squirrels probably intend to eat these seeds at some time; but when a hawk or some other bird of prey kills the squirrel, that bird by that act preserves the seed that the squirrel has hidden. That bird has done its part to protect the planted seed. Squirrels thus provide for an annual seed planting in the woods, so that, if the trees are destroyed, other trees will spring up to take their place; but the birds distribute seed in the open country also. The blue jay alone, as Bartram says, would replant all the cleared lands in a few years, so industrious is he in distributing the seeds of trees.

NATURE'S PRUNING.

As the trees grow they produce too many limbs and twigs, too much foliage and fruit. The pruning of limbs is left by nature to shade, wind, ice and snow; but much pruning of twigs, leaves, buds and blossoms is accomplished by the birds that feed on them. The ruffed grouse or partridge, rose-breasted grosbeak, purple finch and other species live largely on buds, leaves or blossoms. Such pruning as they ordinarily give the tree is beneficial. The food habits of many woodland birds also tend to prevent an excessive amount of pruning by insects, and this brings us to the most important office that is performed by birds.



The ruffed grouse or partridge, budding.

GUARDING THE TREES.

Birds guard all parts of the tree from the too injurious attacks of its insect enemies. The young or larvæ of beetles and cicadas live in the ground, where they feed on roots. Birds which feed much on the ground scratch up or dig up such larvæ or grubs, or catch the beetles and cicadas when they come out of the ground to fly about and mate. These insects form a favorite food of very many birds. Other insects which feed on the tree bury themselves in the ground to undergo their transformations; others still hide among the dead leaves of the forest floor. Such insects are sought out by scratching birds, like the partridge, brown thrasher and chewink.

The trunks and limbs of trees are pierced by the larvæ of boring beetles. These grubs cut channels or burrows in the wood. Other species, known as bark beetles, tunnel between the bark and the wood.

The grubs of boring insects are dug out of their hiding places by woodpeckers. These birds are of great service, for a borer will sometimes kill a tree, and a single woodpecker often destroys many borers in a day. Insects that hide in the crevices of the bark are sought by prying chickadees, creepers and nuthatches. Insects that eat buds and leaves are hunted by warblers, vireos, thrushes, orioles, tanagers, cuckoos, — a host of birds that feed much among the foliage of trees. Insects that reach the flight stage and fly about among the tree tops are taken on the wing by warblers and flycatchers. Those that escape all these and test their

new-grown wings by longer flights are chased by flycatchers; while those that reach the upper air are pursued by swallows, swifts or nighthawks.

When we realize that the unchecked increase of one species of insect might easily be sufficient in a few seasons to enable it to destroy most of the trees of the woods, and when we consider that the birds restrain the increase of hundreds of species of insects, then we can appreciate the value of birds as protectors of trees. It is now well understood that the birds and other natural enemies of



Scarlet tanagers kill gypsy moth caterpillars.

insects ordinarily keep most tree pests so well in check that they do no great or serious injury to trees.

But some one inquires why they do not check the ravages of the gypsy moth and the brown-tail moth. To this we can only answer that birds have not yet become adjusted and accustomed to these imported foreign pests. We cannot doubt that the birds and other natural enemies of these insects will finally prove

effectual against them; but this may not come about for many years. Already more than forty species of birds are known to feed upon one or both of these moths to some extent; but there is very little evidence that any of our birds have yet learned to destroy the eggs of the gypsy moth. The egg is its most vulnerable stage, for it remains in this stage more than half of the year. Furthermore, the caterpillars of both species are protected from birds in some degree by disagreeable hairs. We have not enough birds now, and some of the measures that we take to destroy the moths tend to drive the birds away. The increase of insect pests in the country may be considered good evidence of the lack of birds.

When it is stated on good authority that the people of the United States have suffered from the ravages of insect pests to the extent of about seven hundred million dollars in a single year, when the agriculture of our comparatively small State is said to lose nearly five million dollars annually from the attacks of insects, it is time to look about us to see how we can get help in the war against them; it is time to do something to increase the numbers of the creatures that feed upon these insects.

While we can do little to multiply those useful insects that feed upon other insects, we can protect useful birds, and so bring about their increase. An increase of birds always occurs where conditions are favorable. Tree planting in the prairie States was followed by a multiplication of the numbers of insectivorous birds. The cutting away of coniferous forests in the State of Washington and the settlement of the country there produced a like result.

The great increase and spread of the English sparrow in North America from a few pairs brought here from Europe occurred because it found here abundant food, sufficient protection and good nesting places about our dwellings. Had we left the sparrow in the Old World, where it belonged, and had each householder taken a little pains to provide accommodation and protection for our native birds about his home, they might have been domesticated like the sparrows, and we might have increased their numbers and taught them to become as tame and sociable as is the sparrow. I have proven this in several places by domesticating chickadees, bluebirds, wrens and swallows about my home.

The sparrow has now largely usurped the place in our villages and cities that should have been occupied by our native birds, but we may still do much to increase the numbers of the neglected songsters.

Nothing is more helpful to certain birds than putting up nesting boxes or bird houses. If a box is hung up by a wire, so that it can swing, the sparrows are not likely to use it, but tree swallows and bluebirds may. Sparrows may be kept out of wren boxes by making an entrance no larger than a silver twenty-five cent piece; but for bluebirds and swallows the entrance must be at least one and one-half inches in diameter.

Inexpensive nesting boxes for the birds may be made out of small wooden boxes, fruit cans, worn-out cooking utensils, gourds hollowed out, or sections of hollow limbs. These will accommodate wrens, chickadees, tree swallows, bluebirds or martins. Several other species will nest in boxes occasionally.

One of the best possible ways to observe Arbor Day is by planting trees, shrubbery and vines that will produce food for birds to eat. Trees like the mountain ash, that retain their fruit in winter, are very attractive to birds. Such shrubs as the barberry and sumach, and vines like the Virginia creeper or woodbine, also furnish fruit for birds in the late fall and winter.

There are many trees, shrubs and vines which bear fruit that is not eaten by human kind, but is acceptable and nourishing to birds. The Russian mulberry is one of the most valuable trees to plant, as its fruit ripens early, and many birds prefer it to early cherries or strawberries.

Cone-bearing trees should be planted in groups, to protect the birds from cold winds and storms. These evergreens and tangles of wild shrubs and vines along the fences and roadsides afford places of refuge to which the smaller birds can fly when pursued by their enemies.

Swallows, swifts and phœbes can be encouraged by leaving barns, chimneys and sheds open, that they may enter where they please.

We can feed certain birds in winter by hanging uncleaned bones, fat or suet in the trees. Others can be fed by scattering cracked grain, chaff or hayseed on the ground, in sheds or boxes, or in any sheltered place where the snow will not cover the food. It is most important either to keep no cats, to restrain them when young birds are about, or to keep only such cats as can be taught not to kill birds. But, after all, the human race alone exterminates the birds. The gunner, the bird-shooting Italian, the boy with the air rifle or shot-gun, and the children who go birds' egging, have much to answer for.

It hardly need be said that no boy or girl who knows how useful birds are and how necessary they are to our welfare, or who is accustomed to feed them and provide them with nesting boxes, will ever be guilty of killing birds or destroying their nests or eggs.

Even if our feathered friends were of no practical value, they would still be

indispensable to the world's best happiness. As little messengers of good cheer, as exponents of grace, song and living beauty, as examples of parental devotion, they help to brighten and uplift our lives. All that we can do to render their lives freer, safer and happier should be done as a duty, — as the willing payment of an obligation that we owe.

THE GYPSY AND BROWN-TAIL MOTHS.

BY A. H. KIRKLAND, M.S., STATE SUPERINTENDENT.

THE GYPSY MOTH.

The gypsy moth, a destructive insect pest of the old world, was brought in 1868 from Europe by an experimenter to Medford, Mass. Soon escaping, it spread into many cities and towns. In 1890 the Commonwealth began exter-

minative work against it. By 1900 the State work had so reduced the moth that it was doing little or no serious damage, and, indeed, had been exterminated in many places. The Commonwealth then abandoned operations against the insect, whereupon it soon became again a formidable menace. To-day in many localities the gypsy moth occurs in enormous numbers, as it did in 1890, but it is distributed over a much larger territory than it occupied at that time. It is now found in one hundred and twenty-seven cities and towns of eastern Massachusetts, the infested area comprising in round numbers twenty-three hundred square miles, or more than one-fourth the area of the State. It also occurs in south-eastern New Hampshire, Providence, R. I., and Stonington, Conn.



Female gypsy moth laying egg cluster.

The gypsy moth caterpillar will attack all fruit, shade and woodland trees. It shows a preference for the apple, white oak, red oak,

willow and elm. It will devour on occasion nearly every useful grass, plant, flower, shrub, vine, bush, garden or field crop that grows in Massachusetts. The caterpillar kills both deciduous and coniferous trees. Woodlands assailed by it in formidable numbers are stripped bare. While several consecutive stripings are usually necessary to cause the death of a healthy deciduous tree, one thorough stripping will kill the white pine and other coniferous trees. Where the gypsy moth abounds in residential districts, it swarms, in caterpillar form, upon houses and walks, and often enters dwellings.

Life History.

The eggs of the gypsy moth are laid in July and August, in a yellowish, hair-covered mass, averaging about one and one-half inches long and about three-fourths of an inch wide. In this mass the eggs, to the average number of about five hundred, are closely packed with yellowish hair from the body of the female moth. An individual egg is scarcely as large as a pin head. The egg mass may be found on trees and a great variety of other objects.

The eggs hatch about May 1, and each mass or "cluster" yields a swarm of small caterpillars, the bulk of which become fully grown by midsummer. A gypsy moth caterpillar at any age is decidedly hairy, and its head is large in proportion to its body. This is especially noticeable when the caterpillar is young. The mature caterpillar has a dusky or sooty-colored body. Along the back, counting from the head, which is marked with yellow, are five pairs of blue spots and six pairs of red spots. This double row of spots almost invariably may be seen distinctly on a gypsy moth caterpillar which has attained a length of one inch and a half. No other New England larva has this double row of blue spots and red spots along its back. The mature gypsy moth caterpillar not infrequently attains a length of three inches. When fully grown, usually in July, the caterpillar changes into a pupa or chrysalis, which is dark reddish or chocolate in color, and very thinly sprinkled with light reddish hairs.

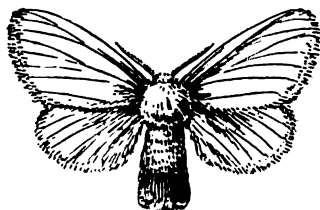
From July 15 to August 15 the winged moths emerge from the pupæ. The male moth is brownish yellow, varying to greenish brown, has a slender body, and expands about one and one-half inches. It flies actively by day, with a peculiar zigzag flight. The heavy-bodied female moth is nearly white, with numerous small black markings, and expands about two inches. She does not fly, otherwise the spread of the gypsy moth would be most rapid. She dies after depositing her egg mass. The winged moths take no food. All damage to foliage is caused by the caterpillars.

Distribution.

The gypsy moth spreads chiefly during the caterpillar stage. The caterpillars have the habit, when small and young, of spinning down on their silken threads from trees, and, falling on vehicles, are then carried from place to place. Electric cars, pleasure and business vehicles and automobiles are common means of thus transporting the gypsy moth. The larger caterpillars often crawl upon vehicles, and by this means are carried from one place to another. The egg clusters of the moth also may be transported upon any of the numerous objects on which they are laid.

THE BROWN-TAIL MOTH.

The brown-tail moth, like the gypsy moth, is a common European pest of fruit and shade trees. It found its way accidentally to Somerville, Mass., in the early '90's, probably in a shipment of roses from Holland, and is now generally disseminated over eastern New England. While at first a pest of the pear and other fruit trees, the brown-tail moth has now adapted itself to feeding on various species of forest trees, notably the oaks. The damage by the brown-tail caterpillars to trees is only a part of the harm wrought by them. When-

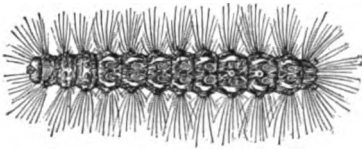


Female brown-tail moth.

ever they come in contact with human flesh they produce in most cases a very severe and painful nettling. This is due apparently not to any poisonous material in their hairs, but rather to the finely barbed and brittle hairs themselves. So severe is this affliction that in many cases people have been made seriously ill by it. The best remedy for it is the liberal use of cooling lotions, or, what is more satisfactory, even if less pleasant, the free use of common vaseline. Where the brown-tail moth caterpillar exists in great numbers, it at times gathers upon houses and even enters them, causing extreme annoyance. Like the gypsy moth, the brown-tail moth, where it abounds, depreciates the value of residential property.

Life History.

The egg mass of the brown-tail moth somewhat resembles that of the gypsy moth, but it is laid on the under side of a leaf, — seldom on a tree trunk, — and is smaller and of a brighter reddish-brown color. The eggs, which are laid from July 15 to the end of the month, hatch during August, and the young caterpillars feed in clusters on the upper surface of the leaves. They soon begin to spin their winter webs. A number of leaves in the vicinity of the egg clusters are drawn together and spun in with a tenacious silken web, grayish in color, and very hard to tear apart. Each web contains about two hundred and fifty caterpillars, and varies in length from four to six inches. With the approach of cold weather the caterpillars enter the web and close the exit holes. They emerge



Caterpillar of the brown-tail moth.

again in the spring, usually early in April, and eat the buds, blossoms, and later the foliage of trees. The full-grown brown-tail caterpillar is about two inches in length, with a broken white stripe on either side, and two conspicuous red dots on the back near the posterior end. Unlike the gypsy caterpillar, the brown-tail caterpillar habitually feeds by day. The caterpillars pupate within their cocoons at the tips of twigs. Usually the mass of cocoons is formed within a spray of leaves, but at times the cocoon is made on a house-wall, fence, tree-trunk, etc. Pupation takes place the latter part of June, and the moths emerge about the middle of July.

The moths are pure white on the wings. The male is slender-bodied, while the female has a conspicuous bunch of brown hair at the tip of the abdomen, hence the name "brown-tail moth." The female has a wing expanse of about one and one-half inches, the male being slightly smaller. Both the male and female brown-tail moths fly mainly by night, and are greatly attracted to lights.

Distribution.

The brown-tail moth is known to have spread at least as far to the northeast as Eastport, Me., and as far south as Cape Cod. The eastern portion of Massachusetts from north to south is now quite solidly infested, though less so south of Boston. The female brown-tail moth, like the male, is a strong, swift flyer, and can carry her eggs long distances before depositing them. In its flight the moth is often aided by strong winds. It is also transported on steamboats and in electric and steam cars, to which it is attracted at night by the lights. The caterpillar of the brown-tail moth has, when young, the "spinning-down" habit already described in the case of the gypsy moth, and is similarly transported by vehicles.

REMEDIES AGAINST THE MOTHS.

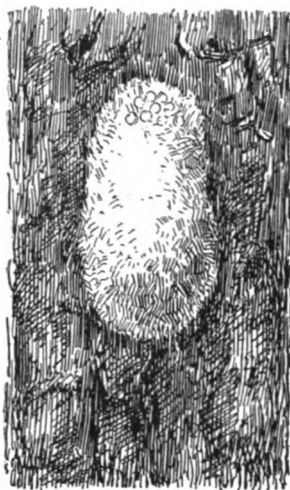
The Gypsy Moth.

The egg masses of the gypsy moth can be killed from August to May by soaking them thoroughly with creosote mixture, which is applied with a small swab or paint brush. Creosote mixture may be purchased at agricultural warehouses and seed stores at from fifty cents to one dollar per gallon, depending on quantity. Where trees and shrubbery are extensively infested with the eggs of the gypsy moth, the growth should be cut and burned. Burning the ground over with oil, to destroy eggs scattered as a result of the cutting of trees and bushes, will be required to insure thorough work.

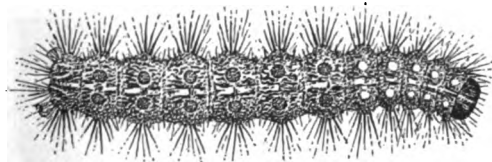
Spraying infested foliage with arsenate of lead, at the rate of ten pounds to one hundred gallons of water, is very effective when the caterpillars are small. Any of the common hand outfits will suffice for the spraying of shrubs or flowering plants. For use on trees, a pump mounted on a barrel or hogshead is desirable. The poison should be thoroughly mixed in water, and applied, if possible, on a clear, dry day, in such a manner as to cover the leaves, rather slowly, with a fine mist. The foliage should never be drenched with a stream. Spraying should begin at the top of the trees. This work is most effective when done during May and early June. Where tall street trees or trees in easily accessible woodland are sprayed, the use of a power outfit is to be recommended.

Burning over infested wood or brush land in May or June is a very effective method of destroying gypsy moth caterpillars when they are very young and small, as they quickly succumb to flame. The trees and bushes should be cut before the hatching time of the eggs, and may be left lying as they fall. A few trees should be left standing, and to these such caterpillars as escape the burning will resort for food, and they may then be killed by spraying or by burlapping.

If a strip of burlap or other coarse, cheap cloth is tied about an infested tree trunk by the middle, in such manner that the flaps hang down, the caterpillars, as soon as they have acquired the night-feeding habit, will gather under the cloth by day, and can then be de-



Egg cluster of gypsy moth.



Full-grown caterpillar of the gypsy moth.

stroyed by crushing or by cutting with a sheath knife. The burlaps should be examined daily, or, when the caterpillars are in great numbers, several times a day. Burlap can be successfully employed from the latter half of May to the first or middle of August, for the caterpillars commonly pupate under burlap, and winged moths lay many eggs under it. The most effective results in using the burlap are obtained where cavities, crevices, etc., in the trees have been first filled with cement or covered with zinc and all loose bark removed. If these hiding places are destroyed, nearly all the caterpillars will seek the burlap at some time during the season.

Banding a non-infested tree with a sticky substance to keep the caterpillars out of it is an effective means of protection, provided the branches of the tree do not interlock with those of an infested tree, and provided the two do not stand so near that the small caterpillars can pass from the infested tree to the other by means of their fine threads. When caterpillars are numerous, they often, in their attempts to cross the band, bridge it over with their threads and dead bodies, with the result that other caterpillars coming later are able to ascend the tree. For this reason, and in order that the caterpillars which collect beneath may be killed, the sticky band should be frequently inspected. If the many caterpillars which frequently "herd" below the bands are not killed, they will in time leave the trees for shrubbery where they are less easily destroyed, there to complete their feeding period and transform into moths. Insect lime, raupenleim, tanglefoot, bodlime, printer's ink or even axle grease are among the materials most used for banding. All may be dangerous to the tree, and should be removed after the caterpillar season has passed.

The Brown-tail Moth.

The winter webs or nests containing the hibernating brown-tail caterpillars are conspicuous objects at the tips of twigs from October to April. They should be cut off with pole shears or long-handled pruners, and carefully collected and burned. It is best, where possible, to burn the webs in a furnace or stove, since where an open bonfire is used extra care must be taken to see that none of the webs escape with a mere scorching. When a light snow is on the ground the work of web gathering can be carried on to best advantage, although it is desirable that this be done as soon as possible after the leaves fall. Where tall trees are infested, two men, one to point out the nests from the ground, the other in the tree to cut off the nests, can work more rapidly and economically than one man. It should be borne in mind that webs cut off and thrown on a dump heap, as well as those that are beaten off by storms, will yield their quota of caterpillars the following spring.



Winter web of brown-tail moth (reduced).

Spraying is very effective against brown-tail moth caterpillars, since they are much less resistant to poison than are those of the gypsy moth. To secure best results, spraying should be done as soon as the foliage develops in the spring. Five to eight pounds of the arsenate of lead paste to one hundred gallons of water is sufficient for the spray; or, if preferred, one pound of good Paris green, kept well stirred in one hundred and fifty gallons of water, may be applied. Spraying may be done not only in the spring, but also in August, when the caterpillars hatch from the egg, except in cases of trees in fruit. Spraying or sprinkling with kerosene emulsion or strong soap suds is often useful in destroying the swarming caterpillars on fences, walks, etc.

When the caterpillars have changed to pupæ enclosed by their cocoons, these may be gathered, although the work is likely to be attended by severe inflammation of the skin, from contact with the nettling hairs.

STATE WORK AGAINST THE MOTHS.

The State work against the gypsy and brown-tail moths is carried on under the provisions of chapter 381, Acts of 1905, which declares the moths to be public nuisances, and requires their suppression. The act is based on the idea of co-operation by State, city or town and individual; and thus certain duties in the matter of the suppression of the moths devolve upon the Commonwealth, the municipality and the citizen.

The State Superintendent for Suppressing the Gypsy and Brown-tail Moths is A. H. Kirkland, 6 Beacon Street, Boston, who will supply bulletins in regard to the moths, and to whom requests for information and advice should be made.

SCHOOL GARDENS IN MASSACHUSETTS.

B. T. GALLOWAY, IN UNITED STATES OFFICE OF EXPERIMENT STATIONS, BULLETIN NO. 160.

To Boston belongs the honor of establishing, in 1891, the first school garden, at the George Putnam Grammar School. It was a garden of ferns and wild flowers, and one that supplied the school with science material. . . . In 1900 individual plats for growing flowers and vegetables were first cultivated. The Boston Normal School in 1901 established the second garden of the kind. . . . Until the year 1904 the greater part of the expense of this work was borne by the Twentieth Century Club, though the school authorities made a yearly appropriation toward it. . . .

For many years the Massachusetts Horticultural Society offered a yearly premium for the best school garden and the best use made of it. . . .

In connection with the playground on Columbus Avenue, the Massachusetts Civic League conducts two hundred and thirty-five well-planned gardens, each approximately four by seven feet, which border the playground, adding much to its attractiveness. . . .

The Education Society of Brookline exists to enrich school work; to suggest, and in many cases to test without expense to the citizens, some measure of popular education; and to bring to all people of its community higher ideals of education. One of its recent acts in developing its purposes was to establish three school gardens, its one object in doing so being to demonstrate the practical value of such gardens. . . .

The principal of the State Normal School at Hyannis has made a thorough study of the correlation of class-room work and out-door work. Gardening is made especially prominent in the second and in the eighth grades. . . .

The school authorities of Worcester lend no assistance toward the school garden work. . . . However, much has been done through some of the more progressive teachers, assisted by a public-spirited citizen, who has offered for the past two years to furnish seeds and fertilizers to schools desiring them. Twenty-seven schools availed themselves of this offer in the summer of 1904. . . .

INFORMATION — SELECTIONS — SUGGESTIONS.

BY FORESTRY DEPARTMENT, STATE FEDERATION OF WOMEN'S CLUBS.

COMPILED BY ADA M. STILES, BRIGHTON.

The forests of America, however slighted by man, must have been a great delight to God; for they were the best he ever planted. The whole continent was a garden, and from the beginning it seemed to be favored above all the other wild parks and gardens of the globe. . . .

These forests were composed of about five hundred species of trees, all of them in some way useful to man, ranging in size from twenty-five feet in height and less than one foot in diameter at the ground to four hundred feet in height and more than twenty feet in diameter, — lordly monarchs, proclaiming the gospel of beauty like Apostles. . . .

The Indians with stone axes could do them no more harm than could gnawing beavers and browsing moose. . . . But when the steel axe of the white man rang out on the startled air their doom was sealed. . . .

In the settlement and civilization of the country, bread more than timber or beauty was wanted; and in the blindness of hunger, the early settlers, claiming heaven as their guide, regarded God's trees as only a larger kind of pernicious weeds, extremely hard to get rid of. Accordingly, with no eye to the future, these pious destroyers waged interminable forest wars; chips flew thick and fast; trees in their beauty fell crashing by millions, smashed by confusion, and the smoke of their burning has been rising to heaven more than two hundred years. . . .

Clearing has surely now gone far enough; soon timber will be scarce, and not a grove will be left to rest in or pray in. . . .

Every other civilized nation in the world has been compelled to care for its forests; and so must we if waste and destruction are not to go on to the bitter end, leaving America as barren as Palestine or Spain. — JOHN MUIR, in "American Forests."

According to the best available data, at least one-half the acreage of the State is better adapted to forests than to any other crop. During the past fifteen years the price of lumber has advanced heavily, is still advancing, and, in the opinion of all the largest dealers, must continue to advance because of increasing scarcity. This is the direct result of laying waste the forests and making no adequate effort to replace them, along with an increase in the demand for wood. The history of our once noble forests is a story of devastation and almost complete neglect.

We are largely dependent upon forests for fuel, bark, pulp and other important products, but chiefly for lumber. The diminishing supply of lumber imposes a most serious problem upon the building of houses, factories, mills, ships, bridges, fences, wharves, vehicles, cars, railroads and electric lines; upon the working of mines and quarries; upon the manufacture of implements, machines, furniture and packing cases; not to name almost the whole list of industries. — State Forester's office, "Leaflet No. 3."

In many European countries it has been the custom for centuries to plant a choice nut tree in commemoration of the birth of a child, and often this is repeated on each succeeding birthday. The results of such a practice are partly seen in the millions of bushels of these nuts produced in those countries for home use and export. This country alone imports annually over twenty millions of pounds of these foreign-growing nuts. With these facts staring us in the face, we may well ask, Why should our roadsides be encumbered and shaded with trees yielding nothing in the way of food for either man or beast, when it would be just as feasible to plant choice nut trees, which would soon give their owners a crop that could be sold in the markets of any city or village, besides making the highways "pleasant ways" and especially for the small boy and his sister, who are always blessed with a good appetite, on their way home from school. — "Indiana Arbor and Bird Day Annual," 1904.

Trees should cover the sources of the springs, brooks and rivers that rise in the mountains and give irrigating waters to the dry valleys at their feet and prevent wasting floods. Many instances can be cited of small hill towns and villages which formerly were places of thriving activity, because throughout the year there was abundant water power which made possible many kinds of mills; now those streams are dry much of the time or have sunk into such insignificant proportions that they are useless, and consequently the mills are in decay and the towns deserted, — a striking illustration of the results of devastating the hillsides. Water escapes from the open ground two-thirds to three-fourths faster than from the floor of the forest, as shown by European observation covering many years. The principal way of escape for the water from the forested area is by seepage. Thus our springs, brooks and streams

have a gradual and continuous supply. Droughts and floods occur with much less frequency when the water is held in reserve by the floor of the forest and is evenly supplied.

The forests of the White Mountains have a direct effect on the water power of five of the New England States. Their preservation by federal action is a matter of far-sighted economy. The Connecticut, the largest river in New England, is capable of being rendered one of the most valuable rivers in the world. The power developed at Holyoke, Mass., is the largest in the country, except that of Niagara. It is also true that the Connecticut and its tributaries are steadily decreasing in volume. Need we question why?—A. M. S.

Let every person who goes into the woods keep in mind the following list of don'ts:—

Don't build a camp fire until all the dry leaves and inflammable material have been raked away to a safe distance.

Don't go away and leave your camp fire burning. Extinguish it completely before you move on.

Don't leave a smudge burning while you are absent.

Don't throw down a lighted match or stub of a cigar.

Don't set fire to a birch tree for the fun of the thing.

Don't burn a bee tree or use fire to smoke out game until every possible precaution is taken to prevent the flames from spreading.

Don't go away and leave the tree on fire.—"Woods and Waters."

Sir Christopher Wren was the architect of that consummation of beauty in building, St. Paul's Cathedral in London, and there among the heroic dead of England's greatest heroes upon land and sea repose his remains. Upon the sarcophagus are inscribed these simple words: "*Si queris monumentum circumspice*,"—"If you seek my monument, look around you." So every man, woman and child who plants trees will be able to say, on coming, as I have come, toward the evening of life, in all sincerity and truth: "If you seek my monument, look around you."—From an Address by the Founder of Arbor Day.

On the last day of President McKinley's life, when the nurse sought to screen his eyes from the light, he objected, saying, "No, I want to see the trees, they are so beautiful." Four years earlier he paid his last visit to the home of President Hayes in Ohio. Almost his first words on arriving were, "I must go around and pay my first tribute to the trees."

It is the wise man, the thoughtful man, the trustful man, the man of large views and of clear perceptions, to whom we must look for successful tree planting. As we grow older as a people, as we gain in culture, as we come more highly to value the beautiful, and as we recognize more

fully that there are possibilities of enjoyment in life higher in kind than those of eating and drinking or of ostentatious exhibition of wealth, we shall plant more trees for ornament and especially for the decoration and better utilization of public grounds and thoroughfares, and we shall in some way find methods by which they can be much better cared for.—DEAN BURRILL.

This public education renders possible the system of fruit trees by the roadside, the beautiful little park and flower garden at the railway station, and tree and shrub groupings and effects everywhere, such as we cannot reach with our present public sentiment.—J. L. BUDD.

The best and highest thing a man can do in a day is to sow a seed, whether it be in the shape of a word, an act or an acorn.—JOHN BOYLE O'REILLY.

As the leaves of trees are said to absorb all noxious qualities of the air and breathe forth a purer atmosphere, so it seems to me as if they drew from us all sordid and angry passions and breathed forth peace and philanthropy.—IRVING.

What conqueror in any part of life's battle could desire a more beautiful, a more noble or a more patriotic monument than a tree planted by the hands of pure and joyous children, as a memorial to his achievements?—B. J. LOSSING.

He who plants an oak looks forward to future ages, and plants for posterity.—WASHINGTON IRVING.

In "*Les Misérables*" there is delineated an ideal lover of nature and of humanity,—the good Bishop of D. He, who, when gently reproached by a domestic for reserving one-fourth of his garden spot for flowers instead of letting her grow vegetables on the whole of it, replied: "The beautiful is as useful as the useful,—perhaps more so." This sentence, in my opinion, is worthy to be emblazoned on the wall of every school-room in our land.

What do we plant when we plant the tree?
We plant the ship which will cross the sea;
We plant the mast to carry the sails;
We plant the plank to withstand the gales,
The keel, the keelson, the beam, the knee;
We plant the ship when we plant the tree.

What do we plant when we plant the tree?
We plant the houses for you and me;
We plant the rafters, the shingles, the floors;
We plant the studding, lath, the doors,
The beams, the siding, all parts that be;
We plant the house when we plant the tree.

What do we plant when we plant the tree?
A thousand things that we daily see;
We plant the spire that out-towers the crag;
We plant the staff for our country's flag;
We plant the shade from the hot sun free,—
We plant all these when we plant the tree.

—HENRY ABBEY, 1890.

The groves were God's first temples. Ere man learned

To hew the shaft, and lay the architrave,
And spread the roof above them,—ere he framed
The lofty vault, to gather and roll back
The sound of anthems, in the darkling wood,
Amidst the cool and silence, he knelt down
And offered to the Mightiest solemn thanks
And supplication.—W. C. BRYANT.

Arbor Day will make the country visibly more beautiful year by year. Every school district will contribute to the good work. The school-house will gradually become an ornament of the village, and the children will be put in the way of living upon more friendly and intelligent terms with the bountiful nature which is so friendly to us.—GEORGE WILLIAM CURTIS.

A little of thy steadfastness,
Rounded with leafy gracefulness,
Old oak, give me,—
That the world's blast may round me blow,
And I yield gently to and fro,
While my stouthearted trunk below,
And firm-set roots unshaken be.

—LOWELL.

The last time I saw James Russell Lowell he walked with me in the garden at Elmwood to say good-bye. There was a great horse-chestnut tree beside the house, towering above the gable, covered with blossoms. The poet looked up and laid his trembling hand upon the trunk. "I planted the nut," said he, "from which the tree grew. My father was with me, and showed me how to plant it."—HENRY VAN DYKE, in "Little Rivers."

One impulse from a vernal wood
May teach you more of man,
Of moral evil and of good,
Than all the sages can.

—WORDSWORTH.

He who plants a tree,
He plants love;
Tents of coolness spreading out above
Wayfarers he may not live to see,
Gifts that grow are best,
Hands that bless are blest.
Plant! Life does the rest.
Heaven and earth help him who plants a tree,
And his work its own reward shall be.

—LUCY LARCOM.

CHESTNUT TIME.

What are these upon the ground,
Dressed in satin jackets brown,
White fur collars, slender neck,
Heads with caps that tassels deck,
Hiding under fallen leaves,
That are scattered by the breeze?
These are chestnuts brown, you see,
Come to visit you and me.

They've been swinging many days,
Where the birds have sung their lays,
Prickly houses closed so tight,
They were hidden from our sight
Till the frost came to their homes,
And invited them to come
Spend the winter, share the joys
Of the happy girls and boys.

—ANON. A. F. S.

AN ANTHEM FOR ARBOR DAY.

Tune "America."

Joy for the sturdy trees!
Fanned by each fragrant breeze,
Lovely they stand!
The song birds o'er them trill,
They shade each tinkling rill,
They crown each swelling hill,
Lowly or grand.

Plant them by stream or way,
Plant them where children play
And tollers rest;
In every verdant vale,
On every sunny swale,
Whether to grow or fall,—
God knoweth best.

God will His blessing send;
All things on Him depend;
His loving care
Clings to each leaf and flower
Like ivy to its tower;
His presence and His power
Are everywhere.

—S. F. SMITH.

Who does his duty is a question
Too complex to be solved by me;
But he, I venture the suggestion,
Does part of his that plants a tree.

—LOWELL.

March! March! March! They will hurry
Forth at the wild bugle sound!
Blossoms and birds in a flurry
Fluttering all over the ground.
Hang out your flags, birch and willow!
Shake out your red tassels, larch!
Up, blades of grass, from your pillow,
Hear who is calling you,—March!

—LUCY LARCOM.

How pleasant the life of a bird must be,
Flitting about in each leafy tree!
In the leafy trees so broad and tall,
Like a green and beautiful palace hall.

—MARY HOWITT.

Among the beautiful pictures
That hang on memory's wall,
Is one of a dim old forest,
That seemeth best of all.

—ALICE CAREY.

For he who blesses most is blest,
And God and man shall own his worth;
Who toils to leave as his bequest,
An added beauty to the earth.

—WHITTIER.

The little cares that fretted me,—
I lost them yesterday
Among the fields above the sea,
Among the winds at play,
Among the lowing of the herds,
The rustling of the trees,
Among the singing of the birds,
The humming of the bees.

The foolish fears of what might happen. —
 I cast them all away
 Among the clover-scented grass,
 Among the new-mown hay,
 Among the husking of the corn
 Where drowsy popples nod,
 Where ill thoughts die and good are born, —
 Out in the fields with God.

— ELIZABETH BARRETT BROWNING.

THE BRAVE OLD OAK.

A song to the oak, the brave old oak,
 Who hath ruled in the greenwood long;
 Here's health and renown to his broad green
 crown,
 And his fifty arms so strong.
 There's fear in his frown when the sun goes down,
 And the fire in the west fades out;
 And he showeth his might, on a wild midnight,
 When the storms through his branches shout.

In the days of old, when the spring with cold
 Had brightened his branches gray,
 Through the grass at his feet crept maidens sweet
 To gather the dew of May;
 And on that day, to the rebeck gay
 They frolicked with lovesome swains.
 They are gone, they are dead, in the churchyard
 laid,
 But the tree, it still remains.

He saw the rare times when the Christmas chimes
 Were a merry sound to hear;
 When the squire's wide hall and the cottage small
 Were filled with good English cheer.
 Now gold hath the sway we all obey,
 And a ruthless king is he;
 But he never shall send our ancient friend
 To be tossed on the stormy sea.

— HENRY FOTHERGILL CHORLEY.

Plant in the spring-time the beautiful trees,
 So that in future each soft summer breeze,
 Whispering through tree-tops may call to our
 mind,
 Days of our childhood then left far behind.
 Days when we learned to be faithful and true;
 Days when we yearned our life's future to view;
 Days when the good seemed so easy to do;
 Days when life's cares were so light and so few.

ARBOR DAY SONG.

Air: "My Bonnie."

The breezes of spring wave the tree-tops,
 The flowers so sweet bloom again,
 O, joyfully birds sing of spring time,
 While flying o'er mountain and glen.

Chorus: —

Sing here, sing there,
 Sing of the spring time to-day, to-day,
 Sing here, sing there,
 Sing of the spring time to-day.

O glorious country of freedom!
 Our lives we will make pure and sweet;
 Thou givest to us this bright spring time;
 With hearts full of love we now greet.

Then shout for the oak in the Northland,
 And answer, O South, with the palm.
 And we who inherit this Union
 Sing gaily our dear nation's psalm.

OAK.

I am the type of strength and steadfastness;
 The man who measureth by me his might
 Howe'er so fierce may prove the conflict's stress
 Will ever stand unvanquished in the fight.

— CLINTON SCOLLARD.

LOST, — THREE LITTLE ROBINS.

Oh, where is the boy, dressed in jacket of gray,
 Who climbed up a tree in the orchard to-day
 And carried my three little birdies away?
 They hardly were dressed,
 When he took from the nest
 My three little robins, and left me distressed.

O wrens, have you seen in your travels to-day
 A very small boy, dressed in jacket of gray,
 Who carried my three little robins away?
 He had light-colored hair,
 And his feet were both bare,
 And he was most cruel to me, I declare.

O butterfly, stop just one moment, I pray;
 Have you seen a boy dressed in jacket of gray,
 Who carried my three little birdies away?
 From his pretty blue eyes
 One might think he was wise,
 But he must be wicked for one of his size.

O boy with blue eyes, dressed in jacket of gray,
 If you will bring back my three robins to-day,
 With sweetest of music the debt I'll repay;
 I'll sing all day long,
 My merriest song,
 And I will forgive you this terrible wrong.

Bobolink, did you see my birdies and me,
 How happy we were on the old apple tree,
 Until I was robbed of my young, as you see?
 Oh, how can I sing,
 Unless he will bring
 My three robins back, to sleep under my wing?

SNOW BIRDS.

Saucy, fluttering, scrambling things,
 Soaring on your gray-brown wings,
 Touched with white, to match the snow,
 Careless of the winds that blow, —
 Snow birds.

How you cheer the traveller's way
 Chattering in the snow, so gay;
 Almost make a fellow glad
 That the weather is so bad, —
 Snow birds.

Prairie roads are not so long,
 Livened with a snatch of song,
 When you sweep through frosty air,
 Helping us defy our care, —
 Snow birds.

God must love this chilly north,
 Since he sends you bravely forth,
 Tiny messengers of hope,
 O'er the prairie's leaden scope, —
 Snow birds.

— ANON.

PINE NEEDLES.

If Mother Nature patches
 The leaves of trees and vines,
 I'm sure she does her darning
 With needles of the pines!

They are so long and slender;
 And sometimes in full view
 They have their threads of cobwebs,
 And thimbles made of dew!
 — "Wisconsin Arbor Day Annual."

Then the little Hiawatha
 Learned of every bird its language,
 Learned their names and all their secrets,
 How they built their nests in Summer,
 Where they hid themselves in Winter.

And the birds sang round him, o'er him,
 "Do not shoot us, Hiawatha!"
 Sang the opechee, the robin,
 Sang the bluebird, the owalssa,
 "Do not shoot us, Hiawatha!"
 — HENRY WADSWORTH LONGFELLOW.

Merry, rollicking, frolicking May
 Into the woods came skipping one day.
 She teased the brook till he laughed outright,
 And gurgled and scolded with all his might;
 She chirped to the birds, and bade them sing
 A chorus of welcome to Lady Spring;
 And the bees and butterflies she set
 To waking the flowers that were sleeping yet;
 She shook the trees till the buds looked out
 To see what the trouble was all about;
 And nothing in nature escaped that day
 The touch of the life-giving, bright young May.
 — MACDONALD.

I know, blue, modest violets,
 Gleaming with dew at morn, —
 I know the place you come from,
 And the way that you are born.

When God cut holes in Heaven, —
 The holes the stars look through,
 He let the scraps fall down to earth, —
 The little scraps are you.

THE PUSSY WILLOW.

'Tis pussy-willow time again,
 The catkins now are out;
 For when we put our furs away,
 'Tis then that theirs come out.

With them the fashions never change, —
 They're just as sweet and dear
 As when the first old "pussy" said,
 "Dear pussies, spring is here!"
 — ALICE LEE.

THE ACORN.

"Little by little," an acorn said,
 As it slowly sank in its mossy bed;
 "I am improving every day,
 Hidden deep in the earth away."

Little by little it slipped the dew,
 Little by little each day it grew;
 Downward it sent out a thread-like root,
 Up in the air springs a tiny shoot.

Day after day and year after year,
 Little by little the leaves appear;
 And the slender branches spread far and wide,
 Till the mighty oak is the forest pride.
 — Harper's "Second Reader."

THREE LITTLE TREES.

[Recitation for a tiny girl. Three other children stand near, — as the trees, — laughing, whispering, telling secrets, clapping hands, etc., in pretty pantomime.]

Way out in the orchard, in sunshine and breeze,
 A-laughing and whispering, grew three little trees.

And one was a plum tree, and one was a pear,
 And one was a rosy-cheeked apple tree rare.

A dear little secret, as sweet as could be,
 The breeze told, one day, to the glad apple tree.

She rustled her little green leaves all about,
 And smiled at the plum, and the secret was out.

The plum told, in whispers, the pear by the gate,
 And she told it to me, so you see it came straight.

The breeze told the apple, the apple the plum,
 The plum told the pear, "Robin Redbreast has come!"

And out in the orchard they danced in the breeze,
 And clapped their hands softly, these three little trees!

— "Journal of Western Canada."

THE KINGSHIP OF THE TREES.

[Directions: Arrange the pupils in a semi-circle, with first and seventh students at the ends. In delivering their respective lines, first student faces audience; the trees in turn — maple, oak, chestnut, pine and elm — step slightly forward, the seventh student turning toward the trees. The trees all step forward when giving the last lines in concert. Perhaps some artistic pupil may be able to make a water-color sketch of each leaf, to be worn as a distinctive badge by the participants in this exercise.]

First student: —

Long since, when winds were calm and growth
 was old,
 Over the trees a silence came;
 And there were musings manifold,
 And then a whisper, last a name,
 Which tree was worthy fame.

As men contend for name and fame, so they
 Contended there which one should be
 The king and wear the crown of May;
 Their voices rose as waves at sea,
 And thus they spake, — each tree.

Second student (representing the maple): —

I am the maple, beautiful and tall;
 No fruit bear I, but calmly wait
 Till perfect leaves and hues of fall
 Shall grace my place at Beauty's gate.
 I'm chosen Tree of State;
 And beauty's best, so I'll be king!

Third student (representing the oak): —

I brave the storm, for I am the hardy oak,
 And toss my branches to the sky;
 I scorn the blinded lightning's stroke,
 And laugh when rolling clouds are by.
 A type of strength am I;
 And strength is best, so I'll be king!

Fourth student (representing the chestnut) : —

I am the chestnut shady, home of squirrels
And happy birds; the livelong day
Gay, laughing boys and merry girls
Within my shade are fast at play,
With fears and cares away;
And joy is best, so I'll be king!

Fifth student (representing the pine) : —

I grow on mountain heights, my spirit free,
The lofty, silent, prayerful pine;
The winds and snows find rest with me,
And men seek out this calm of mine
To dream on things divine;
And peace is best, so I'll be king!

Sixth student (representing the elm) : —

I am the elm, and love to dwell alone;
The clinging vine is wed to me,
And oft our hearts when peaceful grown
Commune with earth and sky and sea,
To learn their mystery;
And wisdom's best, so I'll be king!

Seventh student : —

Then Nature gently rose and queenly spake,
Her voice as soft as summer air :
" My children dear, advice now take,
And learn this from the world of care,
That only freedom's rare.
" Seek no kingship; there is no first nor best;
The best is being best you can.
Live more of life, and never rest;
Each has a work that God began,
And all are in his plan."

The trees (in concert) : —

We'll seek no kingship; there is no first nor best;
The best is being best we can.
Then more of life, and never rest;
We have a work that God began,
And all are in his plan.

— CHARLES AUGUSTUS SCHUMAKER.

THE VIOLETS.

[For three girls.]

We slept(1) in our bed when the cold(2) winds blew,
Cold(2) winds blew, cold(2) winds blew;
When the snow came or went we never(3) knew, —
We never(3) knew.

With his rap(4), tap, tap, came the April rain,
Rap(4), tap, tap, rap, tap, tap!
Cried, " Violets, come, it is spring again, —
Spring time again."

We raised(5) our heads and we peeped this way,
Peeped this(6) way, peeped that(7) way;
The sun was bright, the birds were gay, —
Blue birds were gay.

We worked away while the warm sun shone,
Cheering sun, beautiful sun!
Till we stood(8) up straight with our bonnets on, —
New bonnets on(9).

We bowed to our neighbors(10), to the breeze(11),
We nodded away(12), nodded(12) away;
The wind, surprised, whistled through the trees, —
Through the trees.

The dews they came; they made us cry(13),
For joy(14), you know; for joy(14), you know;
The dear sun smiled till our tears were dry, —
Our tears were dry.

A little maid gathered(15) us, one by one,
One by one, one by one;
A little maid gathered(15) us one by one, —
Yes, — one — by — one.

The wind, not caring to have us go,
Cried No, no, no! No, no, no!
Then pulled off her hat; he loved us so, —
He loved us so.

When roses are coming, our family
Hies(16) away, hurries(16) away;
The rose's dress is so rich and gay, —
We haste away.

Now good-by, little children dear,
Good-by(17), good-by(18);
We're coming(19) to see you again next year, —
Yes, yes, good-by.

Motions: (1) three little girls seated and leaning forward with closed eyes; (2) shiver; (3) shake heads; (4) tap with foot; (5) lift heads and open eyes; (6) look to left; (7) look to right; (8) stand; (9) put on bonnets made of blue paper, the rim being cut in the form of the violet's petals; (10) bow, turning to right; (11) bow, turning to left; (12) turn heads in a circle; (13) pretend to cry; (14) smile; (15) pretend to pick violets; (16) move two or three feet to right (very briskly); (17) bow to audience on left; (18) bow to audience on right; (19) march, taking off bonnets to wave to audience. — From "Modern Methods on the Art of Teaching Marches and Motion Songs, Drills and Pantomimes," taken from Educational Publishing Company.

STUDY OF A TREE.

Outlines and proportions.
Size and perfection of trunk.
Color and markings of bark.
Frequency and direction of branches.
Structure and rate of growth of twigs.
Arrangement and structure of buds.
Form, coloring and abundance of foliage.
Functions of sap and foliage.
Flowers, fruit and seed.
Quantity and dissemination of seed.
Reproduction without seed.
Changes of trees with the seasons.
Variations of trees, due to : —
Differences in location.
Differences in exposure to sunlight, storm and drought.
Neglect.
Injuries from plants, insects, animals and man.
Usefulness : —
As standing trees.
For commercial products.
— State Forester's office, " Leaflet No. 3."

POEMS FOR RECITATION AND READING.

1. Woodman, spare that Tree — Morris.
2. Plant Trees — Whittier.
3. Among the Trees — Bryant.
4. Under the Willows — Lowell.
5. A Forest Hymn — Bryant.
6. When the Green gets back in the Trees — James Whitcomb Riley's "Neighborly Poems."
7. Characteristics of the Trees — Spenser's "Faerie Queen."
8. The Oak — Lowell.
9. Woods in Winter — Longfellow.
10. Autumn Woods — Bryant.
11. The Planting of the Apple Tree — Bryant.

12. Plant a Tree — Lucy Larcom.
13. To M. F., beginning, "Our walk was far among the ancient trees" — Wordsworth.
14. The Vision of Sir Launfal, beginning, "What is so rare as a day in June" — Lowell.
15. Tintern Abbey, beginning, "Knowing that Nature never did betray" — Wordsworth.
16. Hiawatha's Sailing (VII) — Longfellow.

SUGGESTED SUBJECTS FOR ESSAYS.

1. A History of Arbor Day in Massachusetts.
2. My Favorite Tree.
3. A Visit to the Arnold Arboretum.
4. Historic Trees (such as the Charter Oak).
5. The Trees best adapted to Street Planting.
6. Evil Results of Wholesale Tree-cutting.
7. Uses of Trees.
8. The Enemies of Trees.
9. The Forestry System of Germany.
10. What Tree Planting has done for This Neighborhood.
11. The Beauty of Tree Growth.
12. Arbor Day and Its Purposes.
13. Our Forest Reserves, — State and National.

SUGGESTED PROGRAM FOR HIGH SCHOOLS.

1. Song (nature or patriotic).
2. Reading of essay by one of pupils.
3. Suggestive Scripture quotations.
4. Recitations.
5. Address.
6. Song — "Brave Old Oak."
7. Recitations and essays.
8. Planting of trees.

Make the program long enough to admit of pleasurable variety, but guard against such length as to kill interest. Diversity and conciseness should be the motto. Appoint a committee to see that the trees planted are watered and cared for during the year.

SUGGESTED POEMS, — BIRDS.

1. The Birds of Killingworth — Longfellow.
2. The Song Sparrow — Celia Thaxter.
3. How the Leaves come down — Susan Coolidge.
4. Lines to the Maryland Yellow-throat — Van Dyke.
5. Discontented — Sarah O. Jewett.
6. The Emperor's Bird Nest — Longfellow.
7. The Bobolink — Chas. Crouch.
8. Sir Robin, Childhood's Songs — Lucy Larcom.
9. Robert of Lincoln — William C. Bryant.
10. Our Almanac — Thomas Bailey Aldrich.
11. Oriole Stories — Ginn & Co.
12. The Oriole, from Under the Willows — Lowell.
13. The Wood Thrush — Hannah Davis.
14. The Yellow Violet — Bryant.
15. The Little Brown Wren — Clinton Holland.
16. The Myth of the Song Sparrow — E. S. Thompson.
17. The Nightingale and the Glow Worm — Cowper.
18. Songs of Seven — Jean Ingelow.

PROSE READINGS.

1. Selections from The Autocrat of the Breakfast Table — Holmes.
2. Autumn — Henry Ward Beecher.
3. Signs and Seasons, A Taste of Maine Birch — John Burroughs.
4. "Forest Fires" and "Destruction of the Forest" — John Muir, from "Our National Parks."
5. Legend of the Arbutus — Wigwam Stones.

LIST OF BOOKS.

- The Tree Book — Julia E. Rogers.
 In God's Out-of-doors — William A. Quayle.
 Getting acquainted with the Trees — J. Horace McFarland.
 Our National Parks — John Muir.
 Studies of Trees in Winter — Anna Oakes Huntington.
 Our Native Trees — Helen Keeler.
 Old-time Gardens — Alice Morse Earle.
 Practical Forestry — John Gifford.
 Nature Study and Life — Clifton F. Hodge.
 With the Trees — Maud Goings.
 The Six Trees — Mary Wilkins Freeman.
 Trees of New England — Dame and Brooks.
 Forest Land — Robert W. Chambers.
 Children's Gardens — Louise K. Miller.
 Ferns, and how to grow Them — G. A. Woolson.
 Tree-planting on Streets and Highways — William F. Fox.
 Among Green Trees — Julia Rogers.
 American Municipal Progress — Charles Zeublin.
 The Improvement of Towns and Cities — C. M. Robinson.
 The Economic Value of Birds to the State — F. W. Chapman.
 Forest Trees and Forest Scenery — S. F. Schwarz.
 Nature Stories for Little Folk — Carter and Field.
 Little Book of Profitable Tales — Eugene Field.
 Never too Late to mend — Hyde's School Speaker and Reader.
 Trees in Prose and Poetry — Stone and Fickett.
 How to tell the Trees — J. G. Lemmon.
 The Mountain Maid, etc. — Edna Dean Proctor.
 United States Government Bureau of Forestry — Bulletins Nos. 24, 29, 35, 42, 45, 53, 55, 59; A Primer of Forestry, Parts I and II.
 The Chautauquan for June, 1905.
 Third Annual Report of the New Hampshire Society for the Protection of New Hampshire Forests.
 The Fairy Land of Science, chapters 7, 8, 10 — Buckley.
 Lectures before Massachusetts Horticultural Society: —
 1. Practical Nature Study for Public Schools — Mrs. Cora C. Stuart Jones.
 2. Return to Nature — Miss Maud Summers.
 Leaflets 4 and 10 of Cornell University: "A Children's Garden," and "The Birds and I."

